

Remarks

The Subject Application originally included claims 1-75. As explained in paragraph 5 of the Office Action, on 25 May 2004 the Examiner telephoned the undersigned and required restriction of the application to claims within a single invention group, and also required that Applicants elect a single disclosed species. In response, the undersigned verbally elected, without traverse, the invention of the Examiner's Invention Group I, which includes claims 1-61 and 73-75, and specie i (claim 20). Applicants hereby affirm this election and have herein cancelled non-elected claims 62-72. Accordingly, further prosecution of the Subject Application is directed to claims 1-61 and 73-75, but without prejudice to Applicants' right to pursue the inventions of the non-elected claims in a continuing application.

In the Office Action, the Examiner allows claims 24-61, 74, and 75. The Examiner objects to claims 20-22 as being dependent upon a rejected base claim, but indicates that those claims would be allowable if re-written in independent form to include all the limitations of the base claim and any intervening claims.

In the Office Action the Examiner also rejects claims 1-4, 8, 10-12, 15-17 and 23 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,194,066 issued to Hoffman ("Hoffman"). In paragraph 8 of the Office Action, the Examiner asserts that Hoffman teaches a tube that can be used in micro hydraulic applications, wherein the tube has a wall thickness of less than 0.01 microns. The Examiner further asserts that the tube of Hoffman inherently includes inlet, intermediate, and outlet portions. The Examiner further asserts: that a catalyst could be disposed within the tube of Hoffman; that the tube may be used in a sensor; that the tube may be filled with material allowing

it to function as a static mixing structure; that the tube may include a roughened surface analogous to a post; and that the micromachined device of Hoffman may be a heat exchanger.

Further, the Examiner rejects claims 3, 9, and 13 under 35 U.S.C. § 103(a) as having been obvious over Hoffman. The Examiner relies on Hoffman as applied to the claims above, but recognizes that Hoffman does not expressly teach that the tube comprises silicon nitride, that the tube is generally U-shaped, or that a stop valve is disposed within the tube. Nevertheless, the Examiner concludes that the invention of the foregoing claims would have been obvious because Hoffman “fairly suggests all of the above noted features to the skilled artisan”. For example, regarding the shape of the tube, the Examiner points to column 3, line 23, of Hoffman, which states: “tubes formed in this way may be fabricated to stand alone in practically any shape imaginable.” Regarding the recited silicon nitride composition, the Examiner points to column 2, line 62, of Hoffman which purportedly explains that the tube may comprise a “nitride.” Finally, regarding the recited stop valve element, the Examiner considers the element obvious based on the mention of fuel injectors and micro hydraulics in column 8, lines 25-36, of Hoffman.

The Examiner also rejects claims 1, 2, 6-9, 14, 17-19 and 73 under 35 U.S.C. § 103(a) as having been obvious over U.S. Patent No. 6,477,901 issued to Tadigadapa et al. (“Tadigadapa”). The Examiner asserts that Tadigadapa is directed to a micromachined fluidic apparatus comprising a substrate (101) and a tube (106). With regard to claims 2, 9 and 73, the Examiner asserts that the tube of Tadigadapa is U-shaped and includes inlet, outlet, and intermediate portions. Regarding claims 6, 7,

and 14, the Examiner asserts that the substrate of Tadigadapa includes inlet and outlet portions (307), which are connected to the inlet and outlet of the tube. Concerning claim 17, the Examiner asserts that the micromachined device can be used as a sensor. As to claim 18, the Examiner asserts that the device of Tadigadapa comprises an actuator, and regarding claim 19 that the substrate of Tadigadapa defines a sealed cavity wherein substantial portions of the tube are disposed within the cavity. The Examiner does recognize that Tadigadapa does not expressly teach that the wall of the tube has a thickness less than 50 microns, which is recited in claim 1. Nevertheless, the Examiner still considers the invention of the claims obvious because of Tadigadapa's mention of a "micromachined" apparatus "would fairly suggest to the artisan that the tube walls are less than 50 microns thick." The Examiner takes the position in the Office Action that "micromachined" is a term that "generally refers to dimensions on the micron scale." For that reason, the Examiner considers the claimed wall thickness of less than 50 microns as a feature that does not distinguish over Tadigadapa.

In the present amendments, claim 1 has been amended to recite that the fluid conducting tube is "adapted for thermal processing of at least one fluid stream". Support for this amendment is found on, for example, page 11, lines 21-23 of the application, as well as in the originally filed claim 1, which includes the preamble "a micromachined device for thermal processing at least one fluid stream". Neither Hoffman nor Tadigadapa, alone or in combination, teach or suggest a fluid conducting tube that is adapted for thermal processing of at least one fluid stream, as is recited in amended independent claim 1. Instead, Hoffman teaches a tube that may be used in

applications such as microfluidics or heat exchange, which are significantly different from thermal processing of fluids. Moreover, Hoffman does not provide details of how the tube may be used in microfluidics or heat exchange applications, and, importantly, does not teach or suggest using the tube as a fluid conducting tube for thermal processing of a fluid stream. Also, Tadigadapa teaches a free-standing tube, such as a tube for fluid flow measurement. Thus, Tadigadapa also does not teach or suggest using a tube for thermal processing of a fluid stream.

Accordingly, amended claim 1 is patentable over each of the cited references for at least the foregoing reason. Each of the remaining rejected claims depends directly or ultimately from claim 1. Accordingly, for like reasons, each of the dependent claims are patentable over the cited references.

CONCLUSION

For the foregoing reasons, Applicants request that the Examiner issue a Notice of Allowance indicating that all claims pending in the application are allowed. Applicants respectfully request that the Examiner contact the undersigned by telephone to discuss any remaining concerns the Examiner may have with respect to the Subject Application so that those concerns may be expeditiously addressed, without the need for issuance of a further Office Action on the merits.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Mark R. Leslie', written over a horizontal line.

Mark R. Leslie
Registration No. 36,360

Kirkpatrick & Lockhart, LLP
Henry W. Oliver Building
535 Smithfield Street
Pittsburgh, PA 15222-2312

Telephone: (412) 355-6271
Fax: (412) 355-6501